

Practice: Newton's Second Law of Motion Problem Solving

Directions: Use KNEES to solve the following problems.

Mild

1. A bowling ball has a mass of 10 kg. If Andy applies a force of 35 N to the bowling ball, find the ball's acceleration.

Acceleration = _____

2. Alexa is pushing a miniature car with a mass of 23 kg. The car's acceleration is 3 m/s^2 . Find the force Alexa is applying to the car.

Force = _____

3. A truck accelerates at 5 m/s^2 . Find the truck's mass if the driver applies a force of 425 N.

Mass = _____

Medium

4. Brandon is pulling a desk to the right with a force of 26 N. The force of friction is 3 N.
 - a. Draw a free body diagram of the desk.
 - b. Calculate the net force.
 - c. If the desk accelerates at 2 m/s^2 , use the net force from part b to find the mass of the desk.

Spicy

1. Vin Diesel is free-falling out of a plane, and he is accelerating at 10 m/s^2 . If his mass is 34 kg , find Vin Diesel's weight. (ignore air resistance)

2. Chukwudi is pushing a shopping cart with a force of 23 N . Anthony is helping him. The shopping cart endures a force of friction of 2 N , it has a mass of 12 kg , and it is accelerating at 6 m/s^2 . Find the force that Anthony applied.
 - a. Use Newton's Second Law to find the net force acting on the cart.

 - b. Draw a free body diagram that shows all the forces acting on the cart.

 - c. Use what you know about net force to find the force Anthony applies.

Homework: Newton's Second Law of Motion

Directions:

- Use KNEES to complete the following problems.
 - Unless stated in the problem, ignore friction.
1. A force of 20 N is applied to a box of books with a mass of 4 kg. Find the acceleration of the box of books.

Acceleration = _____

2. A force of 24 N is applied to the same box of books. Find the acceleration of the box of books now.

Acceleration = _____

3. Compare answers 1 and 2. What can we say about the acceleration of an object when the force increases? (1 sentence)

4. A car and a truck are on the highway. Both need to accelerate at 7 m/s^2 in order to avoid an accident.
 - a. Find the force acting on the car, which has a mass of 408 kg.

Force = _____

- b. Find the force acting on the truck, which has a mass of 2,100 kg.

Force = _____

- c. Compare 4a and 4b. What can we say about the force of an object when the mass increases and acceleration remains constant? (1 sentence)

5. A mother is pushing a stroller that has a mass of 26 kg.
- a. If she applies a force of 13 N, find the acceleration of the car.

Acceleration = _____

- b. Now a baby jumps back into the stroller, so the mass is 124 kg. If she wants the stroller to accelerate at the same rate (same answer as part a), how much force must the mother apply?

Force = _____

- c. Compare 5a and 5b. What can we say about the force required to maintain the same acceleration when the mass increases? (1 sentence)
